

WHO Sudan

# Facilitator's guide

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June 2007

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### 1. Cholera:

An outbreak of cholera is suspected when there is a sudden increase in the daily number of patients with acute watery diarrhoea, especially patients who pass the 'rice water' stools typical of cholera".

#### Answer Sheet for exercise case study A.(Outbreaks)

- A descriptive title for the table can be:
  - Cases of cholera reported in Gedaref locality 3 July to 23 July,
  - By health facility

There were 62 cases reported in the 3rd full week of July.

1. The usual number of cases is 6-12 a week (since there are 1-2 cases a day), so the number of cases did not increase. However, 3 of 12 patients died, which is an increase in the number of deaths. Even though the increase in cases is not sufficient to suspect an epidemic, you should check what is happening.
2. Yes, you should suspect an outbreak whenever a person aged five years or older develops severe dehydration or dies from acute watery diarrhoea.
3. Yes, you would suspect an outbreak, even if there were only one adult. In an area where cholera is not present, even one case is an unusual increase.
4. You should investigate the possible onset of an outbreak of epidemic dysentery at the same time as the cholera outbreak.
5. How old were the children? If one or both were older than 5, suspect cholera. If both children are under five the definition for a cholera outbreak is not met.
6. How can we calculate the Case fatality Rate (CFR%)? Case fatality Rate (CFR) = total cases/ total deaths X 100, usually a CFR in proper case management is below 1% if more than that it means health provider needs urgent training on case management OR stock is not available?

### 2. Cerebrospinal meningitis

At the beginning of February 2007, the doctor of the Health Centre in New Halfa town informed the DG of epidemiology department MoH, that about 30 cases of meningitis had been seen at the Health Centre since the end of November 2006.

In response to this problem, the local authorities in Kassala asked for an emergency medical team, medications and other supplies including vaccines for 'meningococcal meningitis'.

#### **Q1. You are the district Medical Officer of New Halfa what do you do?**

Collect further information: clinical symptoms, laboratory information, etc. (Don't jump into conclusion, the disease may be viral others meningitis/encephalitis.)

Verify the existing of the outbreak. (Don't forget that there may be the need for help such as laboratory support, drugs, and medical personnel.)

#### **Q2. How can you confirm the outbreak?**

Comparing the reported number of cases with those of previous few years and looking for an unusual increase in the number of cases. It is often helpful to aggregate data by weeks (time), by locality/ district (place) and by age-group (person).

You manage to obtain the number of cases per month (based on clinical diagnosis) declared by the locality since 2004.

**Table shows monthly number of cases of meningitis notified by the Health Centres of New Halfa, January 2004 – January 2007**

<b>Month</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Jan</b>	<b>10</b>	<b>2</b>	<b>5</b>	<b>200</b>
<b>Feb</b>	<b>7</b>	<b>6</b>	<b>6</b>	
<b>Mar</b>	<b>2</b>	<b>5</b>	<b>3</b>	
<b>Apr</b>	<b>0</b>	<b>3</b>	<b>1</b>	
<b>May</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Jun</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Jul</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Aug</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Sep</b>	<b>0</b>	<b>0</b>	<b>5</b>	
<b>Oct</b>	<b>0</b>	<b>0</b>	<b>10</b>	
<b>Nov</b>	<b>1</b>	<b>2</b>	<b>20</b>	
<b>Dec</b>	<b>1</b>	<b>3</b>	<b>36</b>	

**Q3. Comment on the table.**

The number of cases normally increases towards the end of the year and decreases to zero in April or May.

The number of cases had been unusually high since October 2006 and still increasing as of January 2007.

You think that the information that you have is not sufficient to take a decision. You therefore plan a field visit.

**Q4. What will be the objectives of this mission?**

- To describe the epidemiological characteristics of the outbreak.
- To identify the etiologic agent and confirm the outbreak.\
- To suggest appropriated control and prevention measures.

**Q5. What kind of persons should be included in the investigation team?**

Epidemiologist, physician, laboratory technician, immunization officer, information officer, local health officer, locality health officer, translator (if needed).

**Q6. What would you recommend to control the epidemic?**

Mass vaccination against meningococcal meningitis of entire population if resources are available. Vaccination may be restricted to the groups most at risk such as those with the highest attack rates.

Chemoprophylaxis is not an effective means of interrupting transmission during an epidemic.

Increase surveillance activities and laboratory support in the area and adjacent areas.

Prepare for case management: training of physicians and health workers, medication and other supplies.

Health education to alert the public and give advice on risk reduction.

Report to the World Health Organization (International Health Regulation) since the outbreak can spread internationally.

**3. Crimean -Congo Haemorrhagic Fever**

**Q1. What is a viral haemorrhagic fever?**

A viral haemorrhagic fever is a disease which is caused by a virus and has a tendency to disturb blood clotting, so that patients may develop uncontrolled bleeding or “haemorrhaging”. Many common diseases can resemble viral haemorrhagic fever, but the term is reserved for a particular group of diseases associated with a high death rate. In Africa, these include Crimean-Congo haemorrhagic fever, Lassa fever, Marburg disease and Ebola fever. Apart from the fact that they cause similar disease, the viruses are not closely related to each other, and are transmitted in a variety of ways.

**Q2. What is Crimean-Congo haemorrhagic fever?**

Crimean-Congo haemorrhagic fever is a tick-borne viral disease of humans which occurs in Africa, Eastern Europe and Asia.

**Q3. Why does it have the name “Crimean-Congo haemorrhagic fever”?**

A disease given the name Crimean haemorrhagic fever was first recognized on the Crimean Peninsula in 1944, although the virus which causes the disease was only identified in 1967. Meanwhile, in 1956 a virus given the name Congo was isolated from a child with fever in the former Belgian Congo (now Democratic Republic of the Congo). In 1969 it was discovered that the two viruses were the same. Consequently, the virus and the disease are called “Crimean-Congo haemorrhagic fever”. The name is often abbreviated to “CCHF”, and in South Africa the disease is commonly called “Congo fever”.

**Q4. Which people are at risk of becoming infected?**

People who are at particular risk include those involved in the livestock industry, such as

farmers and farm labourers, veterinarians, abattoir workers, persons who slaughter animals informally, and hunters.

Within abattoirs those who come into contact with fresh blood are at greatest risk. Once carcasses have been bled out and hung to mature there is a sudden increase in acidity of the meat and virus cannot be detected in the carcass. Ostriches appear to be the only birds in which there is similar circulation of detectable levels of virus in blood as occurs in mammals. There is no indication that meat processed and matured according to standard abattoir practice constitutes a danger to consumers. Half-fed ticks which detach from the hides of recently slaughtered animals may attach indiscriminately to hosts available in their environment, and thus infect slaughter men.

Apart from people directly involved in the livestock industry, persons at risk of being bitten by ticks include those who live in the countryside and town dwellers who visit the countryside for occupational or recreational purposes, including hunting and hiking. People are not always aware of being bitten by ticks, and in patients with Congo fever ticks have been found attached in concealed sites, such as on the scalp and between the toes.

Occasionally, no direct evidence can be obtained to indicate that a patient with Congo fever had contact with animal blood or with ticks, and the only evidence to suggest possible exposure to infection is the fact that the patient lived in or visited an environment where such contact was possible.

Health care personnel or close associates of a patient can acquire infection from contact of broken skin or mucous membranes with blood or blood-tinged body fluids and wastes of the patient. Although spread of infection to family members has never been recorded in South Africa, it is possible. The only time that infection has been seen in groups of people is when they have been exposed together to a common source of infection, as in slaughtering animals. In contrast, there have been several instances of secondary spread of infection from patients to health care personnel, and this has usually involved needle stick injuries in hospitals.

**Q5. How common is the disease and how often is it fatal?**

In brief, about 1-10 cases of Congo fever are diagnosed each year in South Africa (range 0-20), and 20-25 percent of patients die, but the death rate can be 30-50 per cent if patients do not receive proper medical attention.

More exactly, 158 cases of Congo fever have been diagnosed in southern Africa from the time that the presence of the disease was first recognized in 1981 up until the end of 2000, with one infection having occurred in Zaire, one in Tanzania, ten in Namibia and the remainder in South Africa. Most patients were employed in the livestock industry, and males constituted 129/158 of cases.

**Q6. What are the signs and symptoms of the disease?**

The disease has a short incubation period followed by a very sudden onset of illness.

People usually become sick within 1-3 days of being bitten by a tick, or 5-6 days (occasionally longer) after exposure to the blood of infected livestock or humans. (The short incubation period and sudden onset are among several points of distinction with tick bite fever.)

Patients abruptly develop a severe headache with sore and reddened eyes, fever with cold chills, and intense body pains, particularly involving the muscles of the lower back and thighs. The patients feel extremely unwell and usually take to their beds. Body temperatures do not necessarily remain high and may fluctuate in the course of each day. There may be nausea and vomiting, and sometimes abdominal pain and diarrhoea early in the disease. At this stage, blood tests already show disturbed liver function, and a decrease in blood platelets, which are involved in the clotting of blood.

After about 5 days patients may develop a rash of pink blotches on the body, followed by various bleeding tendencies, depending on the severity of the illness. They bruise easily, often have nose bleeds, and may pass blood in the stool and urine. Stools seldom contain fresh blood; they usually have a dark and tarry appearance. Small or large red spots of bleeding into the skin appear, and there may be large confluent areas of bleeding into the skin around injection sites and in skin folds such as in the armpits or groin. Patients may vomit blood and bleed from the gums, and women may develop heavy uterine bleeding. Blood continues to ooze from needle puncture sites. There can also be internal bleeding, including intracerebral bleeding. Patients go into a coma as liver, kidney and lung functions fail, and death occurs 5-14 days after onset of illness, usually from heart failure.

Patients who recover show sudden improvement from day 10 of illness onwards. Virus remains detectable in human blood for up to two weeks after the onset of illness, but once the results of blood tests indicate that patients' body functions have recovered, and they feel well and are no longer bleeding, they can be discharged from hospital. Although there has been no indication that virus continues to be excreted in body fluids, patients should refrain from intimate contact with other people for six weeks after recovery from the disease as a precaution against spread of infection. Convalescent patients should not undertake heavy duties during this period. After recovery patients are immune to further infection. It is not uncommon for recovered patients to remember little or nothing about the events of their illness.

Treatment essentially consists of supportive therapy, which comprises intravenous feeding of the patient and replacement of blood and clotting factors. Severely ill patients may be placed on ventilators and other life support systems. The chemotherapeutic drug ribavirin has been used to treat patients on a trial basis, but the intravenous form of the drug which is required for seriously ill patients, is virtually unobtainable since it is only produced intermittently on account of low demand.

**Q7. What action should be taken if a person is suspected of having the disease?**

The disease may be suspected when a person suddenly becomes sick with headache, fever and chills, muscle pains, and possibly nausea, vomiting and diarrhoea, less than a week after being bitten by a tick, squashing ticks, or coming directly into contact with

fresh blood or blood-tinged body fluids and organs of livestock, wild animals or human Congo fever patients.

A doctor should be consulted immediately the disease is suspected, and if the doctor believes that the suspicion is justified then arrangements should be made to send blood samples (blood taken with the anti-coagulant EDTA, plus clotted blood) expeditiously to the Special Pathogens Unit of the National Institute for Virology in Johannesburg for confirmation of the diagnosis. It should be remembered that the vast majority of suspected cases prove not to be Congo fever, and if there is doubt the doctor should consult physicians specifically charged with handling viral haemorrhagic fever patients in the province concerned, or members of staff of the Special Pathogens Unit.

Certain major hospitals have been designated for the barrier-nursing of haemorrhagic fever patients in each province, and a resource directory for use by medical personnel is undergoing revision. Meantime, medical personnel who potentially have need of the information should establish for themselves what arrangements exist in their own province. Immediately Congo fever or any other haemorrhagic fever is suspected, medical personnel should ensure that they apply strict precautions against infection from blood and other body fluids. On no account should patients suspected to be suffering from any haemorrhagic fever be referred to a hospital without first discussing the case with the relevant clinicians or specimens are sent to the Special Pathogens Unit without first contacting the Unit.

The doctor (or other health worker certified as competent to diagnose) who makes the diagnosis has a legal obligation to notify the Local Authority Health Services of the existence of the case on form GW17/5.

**Q8. What precautions should be applied to persons who have potentially been exposed to infection?**

Local and provincial health officials are responsible for investigating the circumstances surrounding confirmed cases of the disease, and instituting such control measures as may be necessary. Persons in the community at large, including family members, who have been in contact with confirmed Congo fever patients, or who have been exposed to the same potential source of infection, are classified as being at zero, low, moderate or high risk according to defined criteria, and placed under appropriate observation as discussed below. Medical personnel who have been exposed to patients are separately placed under observation of the infection control officials of the institution concerned.

Contacts considered to be at high risk would, for instance, include persons who have had accidental injury with a needle contaminated with the blood of a confirmed Congo fever patient. Such persons would be placed under active observation, which consists of reporting twice a day to a designated health official to be monitored for signs and symptoms of the disease and to have their temperature recorded for a period of two weeks after last contact with the patient (calculated to exceed the incubation period of Congo fever by a wide margin of safety - the observation period would be extended to three weeks for most of the other viral haemorrhagic fevers). Low risk contacts of

confirmed patients, who have not had closer than one metre face-to-face contact with the patient for instance, may be placed under passive observation, which could consist of reporting to the responsible health official daily by telephone rather than in person.

Note that persons under observation are not in quarantine and may continue with their normal duties, including attending to patients. They are only considered to be infectious once they become sick themselves. As soon as they develop signs and symptoms considered to be characteristic of the disease, or a fever of 38,5 °C or greater, they are admitted to hospital as suspected cases.

Places such as abattoirs constitute a special case. Since exposure potentially occurs on a continuing basis (although the risk is actually low), there is seldom an indication for placing selected individuals under special observation. Instead, clinics attached to abattoirs should maintain a high degree of awareness of Congo fever and other diseases which can be acquired from livestock at all times, and ensure that there is appropriate investigation of sick members of staff.

Family members and co-workers of patients who become infected on farms may be placed under observation depending on their degree of potential exposure to infection, but since the ticks and virus are so widely distributed there is no logic in placing farms under quarantine.

#### **Q9. What measures can be taken to prevent exposure to infection?**

Persons potentially exposed to tick bite can use certain pyrethroid acaricides to treat clothing such as socks and trousers (acaricides are insecticides used against ticks). Formulations which are generally available from shops that sell equipment for camping and outdoor activities, include aerosol sprays and sachets of concentrated acaricide used to prepare emulsions into which clothing is dipped.

Abattoir workers, veterinary staff, farm workers and hunters should use appropriate impervious protective clothing and gloves when engaged in activities which carry a risk of exposure to animal blood. Although it is incumbent upon employers to supply protective clothing and instruction in safety, employees must take responsibility for adhering to safety regulations.

Veterinary regulations promulgated for ostrich abattoirs require that birds should be treated with an appropriate acaricide and held in tick-free circumstances for 14 days before slaughter. Similar regulations would be impossible to implement for other livestock. Vast numbers of cattle, sheep and goats are slaughtered each day, and the costs of constructing tick-free holding pens of suitable capacity would be prohibitive, as would the costs and logistics of holding and feeding the animals and supervising the operation. A potential alternative would be the development of a veterinary vaccine that is applied to farm animals as a public health measure, but such research would require special funding.

At present there is no human vaccine, and the lack of potential demand for such a vaccine inhibits its development.

## 4. Rift Valley Fever

### Q1. How do humans get RVF?

Humans usually get RVF through bites from infected mosquitoes and possibly other biting insects that have virus-contaminated mouthparts. Humans can also get the disease if they are exposed to the blood, body fluids, or tissues of infected animals. Direct exposure to infected animals can occur during slaughter or through veterinary and obstetric procedures. Infection through aerosol transmission of RVF virus has occurred in the laboratory environment.

### Q2. How is RVF prevented?

A person's chances of becoming infected can be reduced by taking measures to decrease contact with mosquitoes and other bloodsucking insects through the use of mosquito repellents and bednets. Avoiding exposure to blood or tissues of animals that may potentially be infected is an important protective measure for persons working with animals in RVF-endemic areas.

### Q3. What needs to be done to address the threat of RVF?

A number of challenges remain for the control and prevention of RVF. Knowledge regarding how the virus is transmitted among mosquitoes and the role of vertebrates in propagating the virus must be answered to predict and control future outbreaks of RVF. Vaccines for veterinary use are available, but they can cause birth defects and abortions in sheep and induce only low-level protection in cattle. The human live attenuated vaccine, MP-12, has demonstrated promising results in laboratory trials in domestic animals, but more research will be needed before the vaccine can be used in the field. In addition, surveillance (close monitoring for RVF infection in animal and human populations) is essential to learning more about how RVF virus infection is transmitted and to formulate effective measures for reducing the number of infections.

## 5. Measles:

### Q1. What is measles?

Measles (also known as rubeola), is a serious disease that causes fever, rash, and other complications. Measles is caused by a virus and spreads very easily from person to person. Do not confuse this illness with rubella which is sometimes called 'German' or '3-day' measles

### Q2. What are the Potential Complications?

- Measles can lead to ear infections, diarrhea, pneumonia, and encephalitis (inflammation of the brain which can lead to convulsions, deafness, or mental retardation) and rarely, death.
- Measles can cause miscarriages or premature delivery in pregnant women

### Q3. How is it spread?

- Virus can be found in droplets and secretions from the nose and throat of a person with measles and contaminate objects that others may touch.
- Measles virus can also be spread through breathing the air where an infected person has been (for up to 2 hours after the infected person was present).

#### **Q4. Who is at risk?**

- Infants who are too young to have been immunized (less than 1 year of age)
- Those who have not received measles vaccine for any reason.
- Persons who were vaccinated with an inactivated vaccine that was available from 1963-1967, and have not been re-vaccinated.
- Persons who received immune globulin near the time that they were vaccinated against measles
- Persons with weakened immune systems, infants, and pregnant women are at increased risk for severe measles.

#### **Q5. How to prevent the disease?**

- Measles can be prevented through vaccination.
- The measles vaccine is combined with the vaccines for mumps and rubella and is known as the MMR vaccine.
- Measles vaccine is given to children when they are 12 to 15 months of age. A second MMR when a child is 3 years
- People who have measles should limit their contact with others until at least 4 full days have passed since the time the rash first appeared.
- People exposed to someone who have measles should consult their health care provider immediately. If they have **not** been vaccinated, measles vaccine can help prevent infection if it is given **within three days** of exposure.

## **6. Shigella Dysentery**

### **Q1. What is dysentery?**

It is an infectious illness caused by a germ called *shigella*. It causes diarrhoea (sometimes bloody), fever, stomach ache and, sometimes, vomiting. The illness may last for only a day or continue for 1 or 2 weeks.

The incubation period (the time taken from swallowing the germs until the illness starts) is usually 1-3 days, but can be up to 1 week.

### **Q2. Who is at risk ?**

Anyone, The very young are particularly vulnerable, with the most common places for *shigella* outbreaks being schools and nurseries.

### **Q3. How is dysentery caught?**

Most people catch it by swallowing *shigella* germs that have been passed from the bowel of someone who has it. It is often passed on unwashed hands and by touching contaminated surfaces such as toilet flush handles, door knobs etc.

On rare occasions it can be spread by food and water. It is also associated with eating contaminated food or drinking water when travelling abroad.

### **Q4. How can I avoid catching it?**

By good personal hygiene.

- Always wash and dry your hands thoroughly after going to the toilet;
- Always wash hands thoroughly after changing a baby's nappy;
- Always wash hands thoroughly before preparing and eating food; and
- Only drink water from safe sources, and if you are not sure boil it first.

#### **Q5. What do I do if I or a member of my household has dysentery?**

Make sure everybody washes their hands thoroughly with warm water and soap:

- After using or cleaning the toilet;
- After looking after another person with diarrhoea
- After changing a baby's nappy;
- After handling or washing soiled clothes and bedding;
- Before eating or preparing food.

Although shigellosis is usually a self-limited illness, antibiotics can shorten the course, and in the most serious cases, might be life-saving. When therapy is indicated, a fluoroquinolone antibiotic is the recommended first-line treatment for non-pregnant adults, such as ciprofloxacin 500 mg twice daily for three days. Alternative antimicrobial agents include trimethoprim-sulfamethoxazole, azithromycin, and ceftriaxone. Antidiarrheal agents such as loperamide (Imodium) or diphenoxylate with atropine (Lomotil) are likely to make the illness worse and should be avoided.

While shigellosis usually resolves in 5 to 7 days, it may be several months before an affected person's bowel habits are entirely normal. In some persons, especially young children, the elderly, and immune compromised persons, the diarrhea can be so severe that the affected person needs to be hospitalized. Complications of shigellosis include severe dehydration, seizures in small children, rectal bleeding, and invasion of the blood stream by the bacteria

Up to 3% of persons infected with *Shigella* may later develop a syndrome that includes joint pain and swelling, irritation of the eyes, and sometimes painful urination. This is a reaction to the previous gastroenteritis and is called "reactive arthritis" or Reiter's Syndrome. Basically, the immune system, intending to fight *Shigella*, attacks the body's cells. Reiter's Syndrome is most common in persons with the human leukocyte antigen (HLA) B27 genetic makeup. Reiter's Syndrome can last for months or years, can lead to chronic arthritis, and may be difficult to treat.

#### **Q6. How is *Shigella* detected and treated?**

A culture of an infected person's stool sample can identify the *Shigella* bacteria. The laboratory can also do special tests to tell which species of *Shigella* the person has and which antibiotics would be best to treat it.

#### **Q7. How can a *Shigella* infection be prevented?**

Frequent and careful hand washing with soap and water should be done by both the ill individual and anyone who is in contact with that person. Young children with a *Shigella* infection, or with diarrhea of any cause, should not be in contact with uninfected children.

Everyone who changes an infected child's diapers should be sure the diapers are disposed of properly in a closed-lid garbage can and should wash their hands carefully with soap and warm

water immediately after changing the diapers. After use, the diaper changing area should be wiped down with disinfectant.

Shigella organisms are killed by heat used in cooking. People who have shigellosis or any diarrhea should not prepare food for others until they have been shown to no longer be carrying the bacteria.

At swimming pools, maintaining a chlorine level of at least 0.5-PPM will kill Shigella

## **7. Hepatitis E**

### **Q1. How is HEV transmitted?**

**It's one of group B list of diseases and for weekly basis notification**

HEV is transmitted via the faecal-oral route. Hepatitis E is a waterborne disease, and contaminated water or food supplies have been implicated in major outbreaks. Consumption of faecally contaminated drinking water has given rise to epidemics, and the ingestion of raw or uncooked shellfish has been the source of sporadic cases in endemic areas. There is a possibility of zoonotic spread of the virus, since several non-human primates, pigs, cows, sheep, goats and rodents are susceptible to infection. The risk factors for HEV infection are related poor sanitation in large areas of the world, and HEV shedding in faeces.

Person-to-person transmission is uncommon. There is no evidence for sexual transmission or for transmission by transfusion.

### **Q2. Where is HEV a problem?**

The highest rates of infection occur in regions where low standards of sanitation promote the transmission of the virus. Epidemics of hepatitis E have been reported in Central and South-East Asia, North and West Africa, and in Mexico, especially where faecal contamination of drinking water is common. However, sporadic cases of hepatitis E have also been reported elsewhere and serological surveys suggest a global distribution of strains of hepatitis E of low pathogenicity.

### **Q3. When is a HEV infection life-threatening?**

In general, hepatitis E is a self-limiting viral infection followed by recovery. Prolonged viraemia or faecal shedding are unusual and chronic infection does not occur.

Occasionally, a fulminant form of hepatitis develops, with overall patient population mortality rates ranging between 0.5% - 4.0%. Fulminate hepatitis occurs more frequently in pregnancy and regularly induces a mortality rate of 20% among pregnant women in the 3rd trimester.

### **Q4. What are the epidemic measures steps for HEV?**

- Determination of the mode of transmission.
- Identification of the population exposed to increased risk of infection.
- Elimination of a common source of infection.
- Improvement of sanitary and hygienic practices to eliminate faecal contamination of food and water.

### **Q5. What are the major response strategies for HEV?**

#### **1. Establishing Coordination Mechanism for Efficient Response:**

Outbreak Preparedness & Response Group should be established at the local IDP camp level. This should involve all key stakeholders like government agencies (health and water & sanitation), WHO, UNICEF and NGOs. This group should agree on a strategy and activities at the outset. Then it should continue to meet at appropriate intervals regularly to monitor progress in implementation activities and to evaluate its impact.

#### **2. Enhanced surveillance for early detection of cases:**

Case based, daily intensive surveillance strategy should be implemented during the period of the outbreak. Health workers/ volunteers should go house-to-house for active search of the cases. When cases are found during this type of outreach activities, it should be ensured that they visit health facilities for thorough assessment & investigation and for health information/education.

Active monitoring of incidence data from EWARS should continue on routine basis. Severity of outbreak should be monitored by detailed morbidity & mortality analysis of the available data. Extra efforts should be made to ensure better quality of data during the outbreak.

#### **3. Epidemiological investigation to identify exposure, source of infection & mode of transmission:**

A thorough epidemiological investigation of any increased reporting of jaundice cases should be carried out. The team should be composed of public health professional with expertise in epidemiology, environmental health and clinical medicine. Case investigation form and the linelisting form should be filled out for each new case. Investigation should include inquiring about food/water source, latrine type, family & travel history, exposure to other cases and contact with animals, etc to find-out about the source of infection and mode of transmission.

Data should be analysed in terms of time, place and person to identify high risk population for suitable and targeted interventions.

Epidemiological Curve should be developed and maintained on daily basis. Different interventions should also be placed on the curve, to help monitor the interventions.

#### **4. Laboratory component/ diagnosis:**

Since cases of hepatitis E are not clinically distinguishable from other types of acute viral hepatitis, diagnosis is made by blood tests which detect elevated antibody levels of specific antibodies to hepatitis E in the body or by reverse transcriptase polymerase chain reaction (RT-PCR).

One laboratory confirmed case of Hepatitis E should prompt all cases of acute jaundice syndrome as Hepatitis E. It should be suspected in outbreaks of waterborne hepatitis, especially if the disease is more severe in pregnant women, or if hepatitis A has been excluded. If laboratory tests are not available, epidemiologic evidence can help in establishing a diagnosis.

The laboratory to process above samples should be identified well in advance and procedures and protocols should be followed accordingly.

Once ongoing outbreak of Hepatitis E is confirmed, collection of lab samples from each and every case is not required and may waste scarce resources.

#### **5. Environmental sampling:**

In addition to water quality checks for residual chlorine at different water distribution points, water samples should be taken to test presence of fecal coliform (bacteriology).

Specific recommendations to collect, store and transport the lab samples should be followed.

#### **8. Dengue Fever**

##### **Q1. What is dengue?**

Dengue (pronounced den' gee) is a disease caused by any one of four closely related viruses (DEN-1, DEN-2, DEN-3, or DEN-4). The viruses are transmitted to humans by the bite of an infected mosquito. It is estimated that there are over 100 million cases of dengue worldwide each year.

It's one of group A for immediate notification (within 24 hours)

##### **Q2. What is dengue hemorrhagic fever (DHF)?**

DHF is a more severe form of dengue. It can be fatal if unrecognized and not properly treated. DHF is caused by infection with the same viruses that cause dengue. With good medical management, mortality due to DHF can be less than 1%.

##### **Q3. How are dengue and dengue hemorrhagic fever (DHF) spread?**

Dengue is transmitted to people by the bite of an *Aedes* mosquito that is infected with a dengue virus. The mosquito becomes infected with dengue virus when it bites a person

who has dengue or DHF and after about a week can transmit the virus while biting a healthy person. Dengue cannot be spread directly from person to person.

**Q4. Is there an effective treatment for dengue hemorrhagic fever (DHF)?**

As with dengue, there is no specific medication for DHF. It can however be effectively treated by fluid replacement therapy if an early clinical diagnosis is made. Hospitalization is frequently required in order to adequately manage DHF. Physicians who suspect that a patient has DHF may want to consult the Dengue Branch at CDC, for more information.

**Q5. Where can outbreaks of dengue occur?**

Outbreaks of dengue occur primarily in areas where *Aedes aegypti* (sometimes also *Aedes albopictus*) mosquitoes live. This includes most tropical urban areas of the world. Dengue viruses may be introduced

**Q6. What can be done to reduce the risk of acquiring dengue?**

There is no vaccine for preventing dengue. The best preventive measure for residents living in areas infested with *Aedes aegypti* is to eliminate the places where the mosquito lays her eggs, primarily artificial containers that hold water. Items that collect rainwater or are used to store water (for example, plastic containers, 55-gallon drums, buckets, or used automobile tires) should be covered or properly discarded. Pet and animal watering containers and vases with fresh flowers should be emptied and scoured at least once a week. This will eliminate the mosquito eggs and larvae and reduce the number of mosquitoes present in these areas. For travelers to areas with dengue, as well as people living in areas with dengue, the risk of being bitten by mosquitoes indoors is reduced by utilization of air conditioning or windows and doors that are screened. Proper application of mosquito repellents containing 20% to 30% DEET as the active ingredient on exposed skin and clothing decreases the risk of being bitten by mosquitoes. The risk of dengue infection for international travelers appears to be small, unless an epidemic is in progress.

## **9. Avian Influenza**

**Q1. What is avian influenza?**

Avian influenza, or “bird flu”, is a contagious disease of animals caused by viruses that normally infect only birds and, less commonly, pigs. Avian influenza viruses are highly species-specific, but have, on rare occasions, crossed the species barrier to infect humans.

In domestic poultry, infection with avian influenza viruses causes two main forms of disease, distinguished by low and high extremes of virulence. The so-called “low pathogenic” form commonly causes only mild symptoms (ruffled feathers, a drop in egg production) and may easily go undetected. The highly pathogenic form is far more dramatic. It spreads very rapidly through poultry flocks, causes disease affecting multiple internal organs, and has a mortality that can approach 100%, often within 48 hours.

**Q2. What are the implications for human health?**

The widespread persistence of H5N1 in poultry populations poses two main risks for human health.

The first is the risk of direct infection when the virus passes from poultry to humans, resulting in very severe disease. Of the few avian influenza viruses that have crossed the species barrier to infect humans, H5N1 has caused the largest number of cases of severe disease and death in humans. Unlike normal seasonal influenza, where infection causes only mild respiratory symptoms in most people, the disease caused by H5N1 follows an unusually aggressive clinical course, with rapid deterioration and high fatality. Primary viral pneumonia and multi-organ failure are common. In the present outbreak, more than half of those infected with the virus have died. Most cases have occurred in previously healthy children and young adults.

A second risk, of even greater concern, is that the virus – if given enough opportunities – will change into a form that is highly infectious for humans and spreads easily from person to person. Such a change could mark the start of a global outbreak (a pandemic

### **Q3 What about the pandemic risk?**

A pandemic can start when three conditions have been met: a new influenza virus subtype emerges; it infects humans, causing serious illness; and it spreads easily and sustainably among humans. The H5N1 virus amply meets the first two conditions: it is a new virus for humans (H5N1 viruses have never circulated widely among people), and it has infected more than 100 humans, killing over half of them. No one will have immunity should an H5N1-like pandemic virus emerge.

All prerequisites for the start of a pandemic have therefore been met save one: the establishment of efficient and sustained human-to-human transmission of the virus. The risk that the H5N1 virus will acquire this ability will persist as long as opportunities for human infections occur. These opportunities, in turn, will persist as long as the virus continues to circulate in birds, and this situation could endure for some years to come.

### **Q4. Can a pandemic be prevented?**

No one knows with certainty. The best way to prevent a pandemic would be to eliminate the virus from birds, but it has become increasingly doubtful if this can be achieved within the near future.

Following a donation by industry, WHO will have a stockpile of antiviral medications, sufficient for 3 million treatment courses, by early 2006. Recent studies, based on mathematical modelling, suggest that these drugs could be used prophylactically near the start of a pandemic to reduce the risk that a fully transmissible virus will emerge or at least to delay its international spread, thus gaining time to augment vaccine supplies.

The success of this strategy, which has never been tested, depends on several assumptions about the early behaviour of a pandemic virus, which cannot be known in

advance. Success also depends on excellent surveillance and logistics capacity in the initially affected areas, combined with an ability to enforce movement restrictions in and out of the affected area. To increase the likelihood that early intervention using the WHO rapid-intervention stockpile of antiviral drugs will be successful, surveillance in affected countries needs to improve, particularly concerning the capacity to detect clusters of cases closely related in time and place.

#### **Q5. What strategic actions are recommended by WHO?**

Recommended actions aim to strengthen national preparedness, reduce opportunities for a pandemic virus to emerge, improve the early warning system, delay initial international spread, and accelerate vaccine development.

#### **Q6. Is the world adequately prepared?**

No. Despite an advance warning that has lasted almost two years, the world is ill-prepared to defend itself during a pandemic. WHO has urged all countries to develop preparedness plans, but only around 40 have done so. WHO has further urged countries with adequate resources to stockpile antiviral drugs nationally for use at the start of a pandemic. Around 30 countries are purchasing large quantities of these drugs, but the manufacturer has no capacity to fill these orders immediately. On present trends, most developing countries will have no access to vaccines and antiviral drugs throughout the duration of a pandemic.

### **10. Ebola Hemorrhagic Fever**

#### **Q1. What is Ebola Hemorrhagic Fever?**

Ebola hemorrhagic fever (Ebola HF) is a severe, often-fatal disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees) that has appeared sporadically since its initial recognition in 1976.

The disease is caused by infection with Ebola virus, named after a river in the Democratic Republic of the Congo (formerly Zaire) in Africa, where it was first recognized. The virus is one of two members of a family of RNA viruses called the Filoviridae. There are four identified subtypes of Ebola virus. Three of the four have caused disease in humans: Ebola-Zaire, Ebola-Sudan, and Ebola-Ivory Coast. The fourth, Ebola-Reston, has caused disease in nonhuman primates, but not in humans

#### **Q2. How is Ebola hemorrhagic fever prevented?**

The prevention of Ebola HF in Africa presents many challenges. Because the identity and location of the natural reservoir of Ebola virus are unknown, there are few established primary prevention measures.

If cases of the disease do appear, current social and economic conditions often favor the spread of an epidemic within health-care facilities. Therefore, health-care providers must be able to recognize a case of Ebola HF should one appear. They must also have the capability to perform diagnostic tests and be ready to employ practical viral hemorrhagic fever isolation precautions, or barrier nursing techniques. These techniques include the wearing of protective clothing, such as masks, gloves, gowns, and goggles; the use of infection-control measures, including complete equipment sterilization; and the isolation of Ebola HF patients from contact with unprotected persons. The aim of all of these techniques is to avoid any person's contact with the blood or secretions of any patient. If a patient with Ebola HF dies, it is equally important that direct contact with the body of the deceased patient be prevented.

## **11. Yellow Fever**

### **Q1. What is Yellow fever?**

Yellow fever is a viral haemorrhagic fever transmitted by mosquitos infected with the yellow fever virus. The disease is untreatable, and case fatality rates in severe cases can exceed 50%. Its one of group A for immediate notification (24 hours)

### **Q2. What is the infectious agent that causes yellow fever?**

Yellow fever is caused by the yellow fever virus.

### **Q3. How do people get yellow fever?**

People get yellow fever from the bite of an infected female mosquito. The mosquito injects the yellow fever virus into the bite.

### **Q4. How soon after exposure do symptoms appear?**

Symptoms start 3 to 6 days after being bitten by an infected mosquito.

### **Q5. Who is at risk for yellow fever?**

People are at risk if they travel to an area where there is yellow fever in humans or monkeys and there are mosquitoes to spread the virus.

### **Q6. What complications can result from yellow fever?**

Severe yellow fever infections can be fatal.

### **Q7. How common is yellow fever?**

Yellow fever is common in West and Central Africa and in parts of South America. Periodic epidemics in Africa lead to hundreds of thousands of cases. Yellow fever is a very rare cause of illness in U.S. travelers.

### **Q8. How can yellow fever be prevented?**

Yellow fever can be prevented through immunization with the 17D yellow fever vaccine. The vaccine is safe, inexpensive and reliable. A single dose provides protection against the disease for at least 10 years and possibly life-long.

There is high risk for an explosive outbreak in an unimmunized population—and children are especially vulnerable—if even one laboratory-confirmed case of yellow fever occurs in the population. Effective activities for disease surveillance remain the best tool for prompt detection and response to an outbreak of yellow fever especially in populations where coverage rates for yellow fever vaccine are not high enough to provide protection against yellow fever.

#### **Q9. What are the strategies for yellow fever control and prevention?**

##### **Strategy 1. Detect and control outbreaks of yellow fever**

An outbreak of yellow fever is defined as at least one confirmed case. Detection and control of a yellow fever outbreak requires a reliable disease surveillance system that will lead to:

- Early detection and immediate reporting of the suspected case of yellow fever.
- Prompt collection of laboratory specimens for laboratory confirmation of a suspected case.

Advance preparation for implementing emergency immunization activities when an outbreak is confirmed.

An emergency immunization response targets all persons in the area around the outbreak, regardless of their yellow fever immunization history.<sup>1</sup> Advance preparation includes assessing the current availability of vaccines, cold chain supplies, immunization equipment and trained personnel. Emergency immunization activities will require a demand for additional amounts of vaccine and other supplies.

Coordination between international, national and local resources that will support the emergency immunization activity should be specified in advance.

##### **Strategy 2. Include yellow fever vaccine in routine childhood immunization Schedules**

When yellow fever is given only in response to an outbreak, very young children and anyone born after the last outbreak and last yellow fever immunization campaign are left at risk for the disease. They will not be protected against yellow fever because yellow fever vaccine is not part of routine immunization activities for these groups.

Consequently, in an outbreak, the incidence rate for yellow fever cases will be higher in children.

To increase protection against yellow fever, integrate the yellow fever vaccine (17D strain) into the national immunization program's childhood immunization schedule. It is safe and convenient to give the yellow fever immunization to all infants when they come for their measles immunization, usually for infants at least nine months of age. The 17D vaccine should never be given to infants less than six months of age because the risk of extreme complications is high in this age group.

If it is agreed upon and appropriate, begin routine yellow fever immunization of infants with a mass immunization campaign that targets all age groups. Prioritize geographic areas for a mass campaign according to the:

- · Interval since the last outbreak;
- · Frequency of epidemics in an area;

- · Ratio of urban to rural cases